Final

Site Investigation Report
Range 16 AST, Parcel 177(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK05
Contract No. DACA21-96-D-0018
IT Project No. 774645

October 2000

Revision 0

Table of Contents

Page

Table of Contents *(Continued)*

Page

List of Tables

List of Figures

List of Acronyms

See Attachment 1 – List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, IT Corporation (IT) conducted a site investigation at the Range 16 Aboveground Storage Tank (AST), Parcel 177(7) Fort McClellan, Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations would present an unacceptable risk to human health or the environment.

IT collected one surface soil sample and one subsurface soil sample for semivolatile organic compound analysis. To evaluate whether detected constituents pose an unacceptable risk to human health or the environment, analytical results were compared to human health site-specific screening levels, ecological screening values, and background screening values for Fort McClellan.

The results of the comparison indicate that phenanthrene and pyrene were detected in the surface soil sample at concentrations exceeding ecological screening values but below residential human health site-specific screening levels and below background screening values. However, because the sample results represent a "worst case" scenario and the visibly contaminated area is very small, the potential impact to ecological receptors is expected to be negligible. Therefore, IT proposes "No Further Action" at the Range 16 AST, Parcel 177(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC) located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510 established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers-Mobile District (USACE). The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Range 16 Aboveground Storage Tank (AST), Parcel 177(7), under Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report has been prepared to present specific information and results compiled from the field investigations, including field sampling and analysis, conducted at the Range 16 AST, Parcel 177(7).

1.1 Project Description

The Range 16 AST, Parcel 177(7) was identified as an area to be investigated prior to property transfer. The Range 16 AST, Parcel 177(7) was assigned to IT as a Category 7 site. In the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998), Category 7 sites are areas that are not evaluated and/or that require further evaluation.

A site-specific field sampling plan (SFSP) attachment and a site-specific safety and health plan (SSHP) attachment were finalized in December 1998 (IT, 1998a). The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at the Range 16 AST, Parcel 177(7). The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998b) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included field work to collect one surface soil sample and one subsurface soil sample to determine if potential site-specific chemicals are present at the Range 16 AST, Parcel 177(7) and to provide data useful in any future corrective measures and closure activities.

1.2 Purpose and Objectives

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to either confirm or rule out the presence of residual chemical contamination at concentrations that would present an unacceptable risk, either to human health or the environment, at the Range 16 AST, Parcel 177(7). The conclusions of the SI presented in Section 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs, ESVs, and polynuclear aromatic hydrocarbon (PAH) background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). The PAH background screening values were developed by IT at the direction of the BRAC Cleanup Team to address the occurrence of PAH compounds in surface soils as a result of anthopogenic activities at FTMC.

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide to propose “No Further Action” at the site or to conduct additional work at the site.

1.3 Site Description and History

The AST at Range 16, Parcel 177(7) was formerly located at the south slope of Howitzer Hill, approximately 60 feet north of an unimproved road on the far southeastern portion of the Main Post (Figure 1-1). The AST was a “storage-only" tank for No. 2 heating oil. Because many of the range offices required heating occasionally, it was more cost efficient to maintain a heating oil AST at these remote buildings than to use other sources to heat the offices during the winter months.

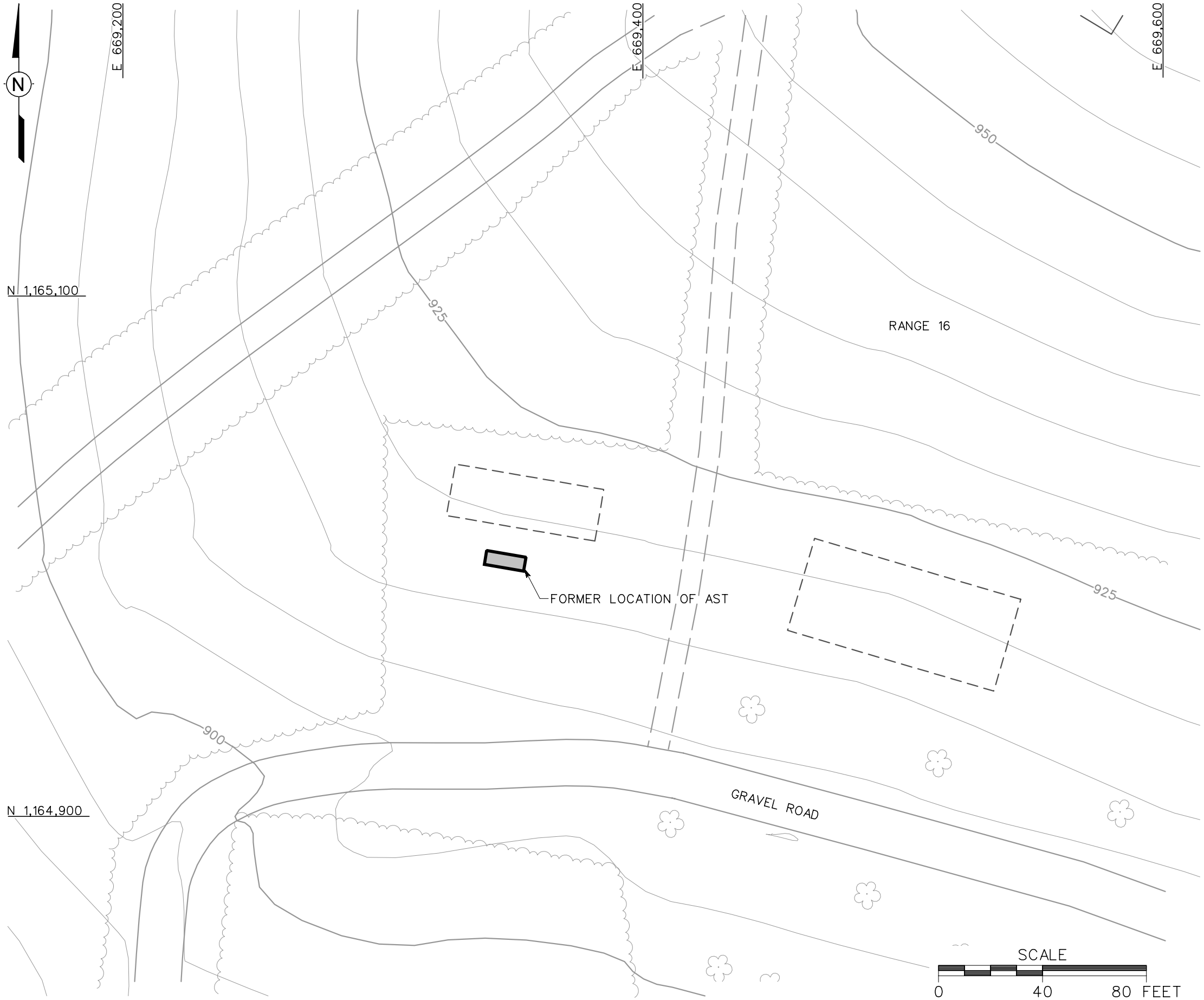
A release has been documented at the Range 16 AST. The tank’s valve was found to be leaking and a drip pan was not present (ESE, 1998). During the IT site visit in June 1998, an approximate 2- by 2-foot area of stained gravel was noted directly under the valve. Prior to SI activities in January 1998, the AST was removed; however, the stained gravel remained. The foundations of the former buildings at the site have been removed. Trees are located to the west, north, and northeast of the parcel. An unimproved road, which lies between the location of the former foundations, joins the gravel road that leads to Range 16 to the northeast (Figure 1-2).

Ground slope is to the south. The site for the buildings previously located at this parcel was graded from the slope of Howitzer Hill at an elevation between 900 and 950 feet. A surface water runoff drain pipe is located adjacent (west) to the north-south unimproved road. The covered drain pipe prevents the washout of gravel that extends from the road to the former building location. The area immediately surrounding the AST is covered with gravel. Between the gravel and the unimproved road to the south is an area of grass with small patches of bare ground. There are not any significant natural drainage features within approximately one-quarter mile of the AST. South Branch of Cane Creek is located approximately 1,600 feet to the east and a tributary is located approximately 1,300 feet to the west of the site.

Range 16 was used from 1951 until middle-1994 and is now closed. Ordnance used at this range most recently were M-203 (40 millimeter grenade), M-72 LAW, and M-18 claymore mine (Case, 1995 and 1996); historically 3.5-rockets (bazooka), and hand grenades were also used. Rounds historically fired at this range were dud-producing rounds. The 142nd Explosive Ordnance Detachment examined the range and found unexploded ordnance (UXO) on the ground surface and buried beneath the ground surface. The 142nd Explosive Ordnance Detachment also identified ordnance types not recently fired at this range. Several FTMC personnel stated that this range is the most heavily UXO-contaminated range that they are aware of at FTMC.

Ordnance ranges have been constructed and abandoned at FTMC since the Spanish-American War. The existence of these ranges is generally unknown to current FTMC personnel. These ranges are now largely or completely overgrown and were not documented. A complete record of range locations and training activities has not been maintained during the history of FTMC, however, an archive search report was recently completed by USACE-St. Louis District. Precise information regarding the location of firing lines and impact areas is unavailable. The oldest available maps that identified ranges (dated 1917) were general in nature and did not contain detail of firing points on impact areas.

Two soil types are associated with this parcel: Allen series and Anniston series. The Allen Series consists of deep, strongly acid, well-drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher lying soils that developed from weathered sandstone, shale, and quartzite. The surface horizon is chiefly dark grayish-brown fine sandy clay loam. Fragments of sandstone and quartzite, as much as 8 inches diameter, are on the surface and throughout the soil. In Calhoun County, the Allen soils are mapped only with the Anniston as undifferentiated units.



LEGEND

- UNIMPROVED ROADS
- PAVED/GRAVEL ROADS
- FORMER BUILDING LOCATION
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY

FIGURE 1-2
SITE MAP
RANGE 16 AST
PARCEL 177(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. JENKINS
INITIATOR: T. WINTON
PROJ. MGR.: 774645
STARTING DATE: 12/23/99
DRAWN BY: D. BILLINGSLEY
DWG. NO.: ...\774645es.438
PROJ. NO.: 774645
DATE LAST REV.:
DRAWN BY:
10/11/00
08:38:50
aw smith
c:\cadd\design\774645es.438

The Anniston Series consists of deep, strongly acid, well-drained soils that have developed in old local alluvium. The parent material has washed from the adjacent, higher lying soils. The surface horizon is mainly very dark-brown loam, and the subsoil is mainly dark-red sandy clay loam. Sandstone and quartzite gravel and cobbles, as much as 8 inches diameter, are on the surface and throughout the soil.

The specific soil type at Range 16 is Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded (AcE2). These soils have stronger slopes and more rapid runoff. In many places, severely eroded patches and shallow gullies are common. The surface soil (plow layer) is reddish-brown to dark reddish-brown gravelly clay loam. Infiltration is slow and the capacity to hold moisture is low.

2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal (including migration) has occurred
2. Areas where only storage has occurred
3. Areas of contamination below action levels
4. Areas where all necessary remedial actions have been taken
5. Areas of known contamination with removal and/or remedial action underway
6. Areas of known contamination where required response actions have not been taken
7. Areas that are not evaluated or require further evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (Community Environmental Response Facilitation Act -Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), the U.S Environmental Protection Agency (EPA) Region IV, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels. Previous environmental studies have not been conducted at the Range 16 AST, Parcel 177(7).

3.0 Current Site Investigation Activities

3.1 Unexploded Ordnance Clearance

UXO clearance was performed at the Range 16 AST, Parcel 177(7) following methodology outlined in Section 4.1.7 of the SAP (IT, 2000a). IT UXO clearance personnel used a Schonstedt Heliflux Magnetic Locator to perform a surface sweep of the parcel prior to site access. After the parcel was cleared for access, the sample location was cleared using a Foerster Ferex electromagnetic detector following procedures outlined in Section 4.1.7.3 of the SAP (IT, 2000a).

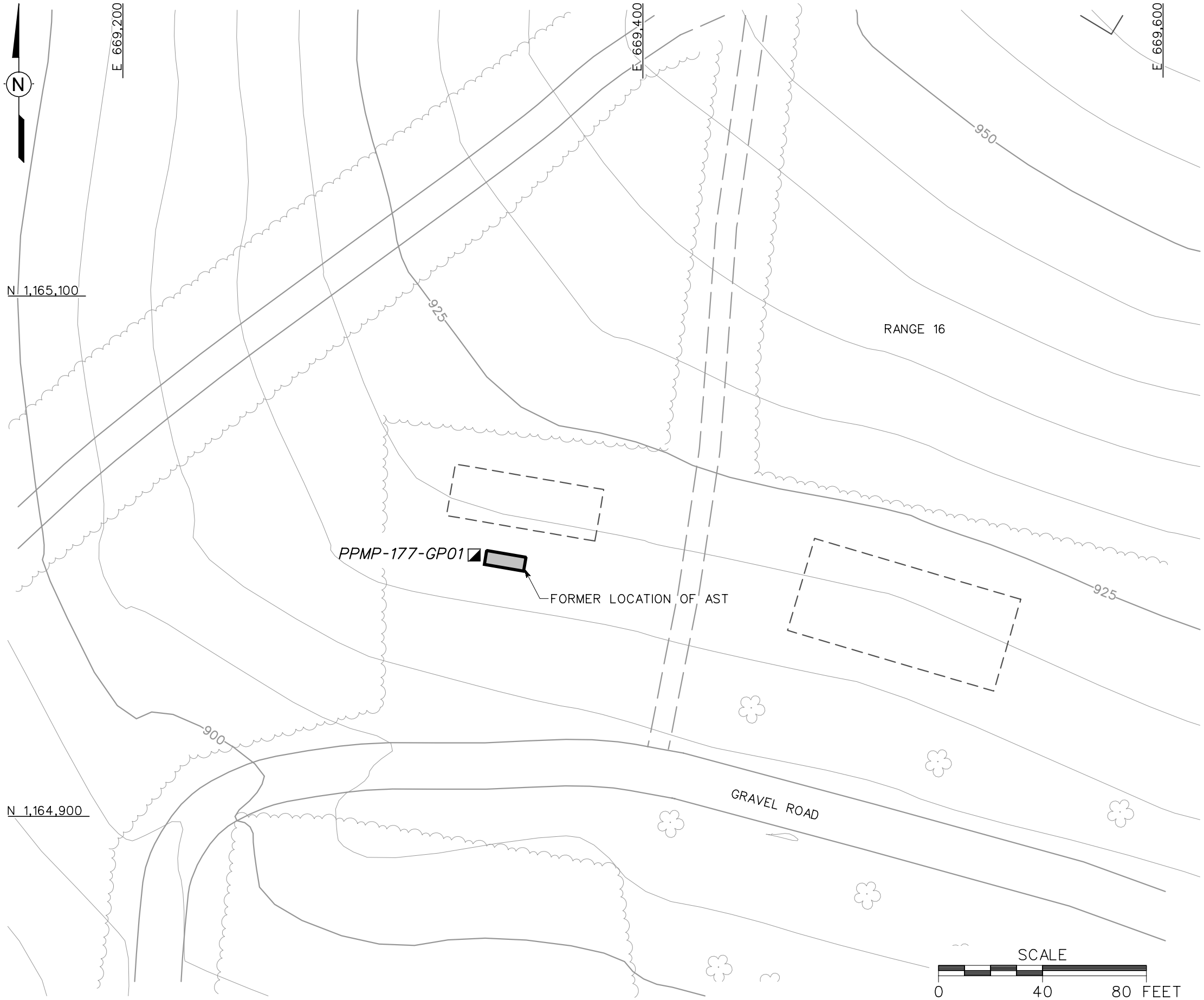
3.2 Environmental Sampling

The environmental sampling performed during the SI at the Range 16 AST, Parcel 177(7), included the collection of surface and subsurface soil samples for chemical analysis. The sample location was determined by observing site physical characteristics noted during the site walkover, UXO clearance activities, and by reviewing historical documents pertaining to activities conducted at the site. The sample location, media, and rationale are summarized in Table 3-1. The sampling location is shown on Figure 3-1. Samples were submitted for laboratory analyses of site related parameters listed in Section 3.4.

3.2.1 Surface Soil Sampling

A surface soil sample was collected from one location at the Range 16 AST, Parcel 177(7). The sampling location and rationale are presented in Table 3-1 and the sampling location is shown on Figure 3-1. The sample designation and quality assurance/quality control samples are listed in Table 3-2. The soil sampling location was determined in the field by the on-site geologist based on the sampling rationale, presence of surface structures, site topography, and buried utilities.

Sample Collection. The surface soil sample was collected from the upper 1 foot of soil with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9 of the SAP (IT, 2000a). The surface soil sample was collected by first removing surface debris, such as rocks and vegetation, from the immediate sample area. The soil was collected with the sampling device and screened with a photoionization detector in accordance with Section 4.5 of the SAP (IT, 2000a). The sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The sample was analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4. The sample collection log is included in Appendix A.



LEGEND

- UNIMPROVED ROADS
- PAVED/GRAVEL ROADS
- FORMER BUILDING LOCATION
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

FIGURE 3-1
SAMPLE LOCATION MAP
RANGE 16 AST
PARCEL 177(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

DWG. NO.: ...\774645es.439 | PROJ. NO.: 774645
INITIATOR: T. WINTON | PROJ. MGR.: 774645
DRAFT. CHCK. BY: | ENGR. CHCK. BY: J. JENKINS
STARTING DATE: 12/23/99 | DRAWN BY: D. BILLINGSLEY
DATE LAST REV.: | DRAWN BY:
10/11/00 08:24:13
c:\cadd\design\774645es.439
aw smith

Table 3-1

Sampling Location and Rationale
Range 16 AST, Parcel 177(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
PPMP-177-GP01	Surface Soil Subsurface Soil	Surface and subsurface soil samples were collected from the stained area under the aboveground storage tank (AST) valve to determine if potential site-specific chemicals are

Table 3-2

Surface and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Range 16 AST, Parcel 177(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-177-GP01	PPMP-177-GP01-SS-KAA0001-REG	0-1	PPMP-177-GP01-SS-KAA0002-FD	PPMP-177-GP01-SS-KAA0003-FS	PPMP-177-GP01-DS-KAA0004-MS	TCL SVOCs
	PPMP-177-GP01-DS-KAA0004-REG	3-5			PPMP-177-GP01-DS-KAA0004-MSD	

FD - Field duplicate
FS - Field split
ft. bgs - feet below ground surface
MS/MSD - Matrix spike/matrix spike duplicate
QA/QC - Quality assurance/quality control
SVOC - Semivolatile organic compound
TCL - Target compound list

3.2.2 Subsurface Soil Sampling

A subsurface soil sample was collected from one soil boring at the Range 16 AST, Parcel 177(7), as shown on Figure 3-1. The subsurface soil sampling location and rationale are presented in Table 3-2. The subsurface soil sample designation, sample depth, and quality assurance/quality control samples are listed in Table 3-2. The soil boring sampling location was determined in the field by the on-site geologist based on the sampling rationale, UXO clearance, the presence of surface structures, site topography, and buried and overhead utilities.

Sample Collection. The subsurface soil sample was collected from the soil boring at a depth of 3 to 5 feet below ground surface in the unsaturated zone. The soil boring was advanced and the sample collected using the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000a). The sample collection log is included in Appendix A. The sample was analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

The subsurface soil sample was field screened using a photoionization detector in accordance with Section 4.5 of the SAP (IT, 2000a) to measure samples for volatile organic vapors. The sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The on-site geologist constructed a detailed boring log for the soil boring. The lithological log for the borehole is included in Appendix B.

At the completion of soil sampling, the borehole was abandoned with hydrated bentonite chips following borehole abandonment procedures summarized in Appendix B of the SAP (IT, 2000a).

3.3 Surveying of Sample Location

The sample location was surveyed using global positioning system survey techniques described in Section 4.2.5 of the SAP (IT, 2000a), and conventional civil survey techniques described in Section 4.19 of the SAP (IT, 2000a). Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983. The ground elevation was referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevation are included in Appendix C.

3.4 Analytical Program

The analyses performed on samples collected at the Range 16 AST, Parcel 177(7) are based on the compounds historically used at the site and EPA, ADEM, FTMC, and USACE requirements. Samples collected from the Range 16 AST, Parcel 177(7) were analyzed for target compound list semivolatile organic compounds (SVOC) using EPA Method 8270C. Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP [IT, 2000a]). Chemical data were reported via hard copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated data is included in Appendix D. The Data Validation Summary Report is included as Appendix E.

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Section 5.0, Table 5-1, of Appendix B of the SAP (IT, 2000a). Sample documentation and chain-of-custodies were recorded as specified in Section 4.13 of the SAP (IT, 2000a).

Completed analysis request and chain-of-custody records were secured and included with each shipment of sample coolers to Quanterra Environmental Services in Knoxville, Tennessee. Split samples were shipped to USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed of as outlined in Appendix D of the SAP (IT, 2000a). The IDW generated from the field sampling at the Range 16 AST, Parcel 177(7) was segregated as follows:

- Soil boring cuttings
- Decontamination water
- Personal protective equipment.

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined rolloff bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, soil boring cuttings and

personal protective equipment generated during the SI at the Range 16 AST, Parcel 177(7) were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in a 500-gallon polyethylene tank prior to characterization and disposal. Liquid IDW was characterized by volatile organic compound, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonregulated waste to the FTMC wastewater treatment plant on the Main Post.

3.7 Variances/Nonconformances

3.7.1 Variances

There were no variances to the SFSP recorded during completion of the SI at the Range 16 AST, Parcel 177(7).

3.7.2 Nonconformances

There were no nonconformances to the SFSP recorded during completion of the SI at the Range 16 AST, Parcel 177(7).

3.8 Data Quality

The field sample results data are presented in tabular form in Appendix D. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the work plan; the FTMC SAP and installation-wide quality assurance plan; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix A. As discussed in Section 3.7, there were no variances or nonconformances identified in the field or during the review of sample collection logs that may have impacted the usability of the data.

Data Validation. A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix E consists of a data validation summary report that was prepared to discuss the results of the validation. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs developed by IT.

Rejected data (assigned an “R” qualifier) were not used in the comparison to the SSSLs and ESVs.

The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

Subsurface investigations performed at the Range 16 AST, Parcel 177(7) provided soil data used to characterize the geology of the site.

4.1 Regional and Site Geology

4.1.1 Regional Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold and thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-gray siltstone and mudstone. Massive to laminated,

greenish-gray and black mudstone makes up the Nichols Formation with thin interbeds of siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appear to dominate the unit and consists primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consist of sandy and micaceous shale and silty, micaceous mudstone, which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of the Main Post and consists of interlayered bluish-gray or pale yellowish-gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in

Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weathers to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites, and limestones, and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish-gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-gray limestone with abundant chert nodules and greenish-gray to grayish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian Age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned

the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

4.1.2 Site Geology

The specific soil type at Range 16 is Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded (AcE2). These soils have stronger slopes and more rapid runoff. In many places, severely eroded patches and shallow gullies are common. The surface soil (plow layer) is reddish-brown to dark reddish-brown gravelly clay loam. Infiltration is slow and the capacity to hold moisture is low.

Bedrock beneath the site is mapped as the Chilhowee Group, undifferentiated. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984). The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The undifferentiated unit is comprised of coarse-grained and fine-grained units. The coarse-grained facies appear to dominate the unit and consist primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consist of sandy and micaceous shale and silty, micaceous mudstone which are locally interbedded with the coarse clastic rocks.

4.2 Site Surface Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama with infiltration rates annually exceeding evapotranspiration rates. The major surface water features at the Main Post of FTMC include Remount Creek, Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County. South Branch of Cane Creek is located approximately 1,600 feet to the east of the site. A tributary to South Branch of Cane Creek is located approximately 1,300 feet to the west of the site.

5.0 Summary of Analytical Results

Samples collected at the Range 16 AST, Parcel 177(7) were analyzed for target compound list SVOCs only. The results indicate that SVOCs have been detected in surface and subsurface soils. Detected SVOCs were compared to the human health SSSLs and ESVs as summarized in the following sections and in Tables 5-1 and 5-2. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluation as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. SVOC concentrations in surface soils that exceeded the SSSLs and ESVs were compared to PAH background screening values, where available. The PAH background screening values were derived from PAH analytical data from 18 parcels at FTMC that were determined to represent anthropogenic activity (IT, 2000b). PAH background screening values were developed for 2 categories of surface soils: beneath asphalt and adjacent to asphalt. The PAH background screening values are the more conservative (i.e., lower) of the PAH background values and are the values used herein for comparison. Complete analytical results are presented in Appendix D.

5.1 Surface Soil Sample Results

One surface soil sample was collected for chemical analysis at the Range 16 AST, Parcel 177(7). The surface soil sample was collected from the upper 1-foot interval of soil at the location shown on Figure 3-1. Analytical results were compared to residential human health and ESVs.

Five SVOCs were detected in the surface soil sample collected at the Range 16 AST, Parcel 177(7). Phenanthrene and pyrene were detected at concentrations exceeding ESVs but below residential human health SSSLs and PAH background values. The analytical results were flagged with a "J" data qualifier signifying that result is greater than the method detection limit but below the specified reporting limit. The SVOCs bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were detected in the surface soil sample. The compounds were also detected in the laboratory method blank associated with the analysis. Neither of these SVOCs were detected at concentrations exceeding residential human health SSSLs. A summary of compounds detected in the surface soil sample is presented in Table 5-1.

5.2 Subsurface Soil Sample Results

Table 5-1

Surface Soil Analytical Results
Range 16 AST, Parcel 177(7)
Fort McClellan, Calhoun County, Alabama

Parcel					PPMP-177				
Sample Location					PPMP-177-GP01				
Sample Number					KAA0001				
Sample Date					02-Feb-99				
Sample Depth (Feet)					0- 1				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
SEMIVOLATILE ORGANIC COMPOUNDS									
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	9.10E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.10E-01	B			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	1.70E-01	B			
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	1.70E-01	J			YES
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	3.10E-01	J			YES

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] BKG - Background.
For SVOCs, value listed is the background screening criterion for soils adjacent to asphalt as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama* , July.

[b] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than the method detection limit but less than or equal to the reporting limit.

mg/kg - Milligrams per kilogram

NA - Not available

Qual - Data validation qualifier

Table 5-2

Subsurface Soil Analytical Results
Range 16 AST, Parcel 177(7)
Fort McClellan, Calhoun County, Alabama

Parcel			PPMP-177		
Sample Location			PPMP-177-GP01		
Sample Number			KAA0004		
Sample Date			02-Feb-99		
Sample Depth (Feet)			3-5		
Parameter	**Units**	**SSSL[a]**	**Result**	**Qual**	**>SSSL**
SEMIVOLATILE ORGANIC COMPOUNDS					
Di-n-butyl phthalate	mg/kg	7.80E+02	1.70E-01	B	
bis(2-Ethylhexyl)phthalate	mg/kg	4.52E+01	1.50E-01	B	

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama* , July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

mg/kg - Milligrams per kilogram

NA - Not available

Qual - Data validation qualifier

One subsurface soil sample was collected for chemical analyses at the Range 16 AST, Parcel 177(7). The subsurface soil sample was collected at a depth of 3 to 5 feet below ground surface at the soil boring location shown on Figure 3-1. Analytical results were compared to residential human health SSSLs.

The SVOCs bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were detected in the subsurface soil sample. The compounds were also detected in the laboratory method blank associated with the analysis. Neither of these SVOCs were detected at concentrations exceeding residential human health SSSLs. A summary of compounds detected in the subsurface soil sample is presented in Table 5-2.

6.0 Summary and Conclusions and Recommendations

IT, under contract with the USACE, completed an SI at the Range 16 AST, Parcel 177(7) at FTMC, Calhoun County Alabama. The SI was conducted to determine whether chemical constituents are present at the site at concentrations that would present an unacceptable risk to human health or the environment. The SI was completed under the BRAC commission process to investigate federal properties prior to public domain transfer. The SI was performed following procedures outlined in SFSP, approved by ADEM and EPA, Region IV. There were not any variances or nonconformances to the SFSP during the completion of SI at the Range 16 AST, Parcel 177(7).

The SI consisted of the sampling and analyses of one surface soil sample and one subsurface soil sample. Analytical results were compared to the human health SSSLs and ESVs developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. SVOC concentrations exceeding SSSLs and ESVs in surface soils were compared to PAH background screening values, where available (IT, 2000b). The results of the comparison indicate that two PAHs (phenanthrene and pyrene) were detected in the surface soil sample at concentrations exceeding ESVs but below residential human health SSSLs and below PAH background values. In addition, two SVOCs (bis[2-ethylhexyl]phthalate and di-n-butyl phthalate) were detected in the surface and subsurface soil sample. Neither of these SVOCs were detected at concentrations exceeding residential SSSLs.

The surface soil sample was collected from a visibly stained area under the former location of the tank's valve, which was documented to have leaked. Thus, the biased sample location is expected to represent a "worst case" scenario of contamination at the site. Further, the horizontal extent (approximately 2 by 2 feet) and vertical extent (less than 1 foot) of contamination is very small. Consequently, the potential impact to human and ecological receptors is expected to be negligible. Therefore, IT proposes "No Further Action" at the Range 16 AST, Parcel 177(7).

7.0 References

Case, Major, Base Range Control Officer, 1995; 1996; 1997, Personal Communication, Personnel interview with John Herbert, ESE, re: FTMC Firing Ranges, Range 32, Pelham Range EOD Area and Weapons Cleaning, Fort McClellan, Alabama.

Cloud, P. E., Jr., 1966, ***Bauxite deposits of the Anniston, Fort Payne, and Ashville areas, northeast Alabama,*** U. S. Geological Survey Bulletin 1199-O, 35p.

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,*** July.

IT Corporation (IT), 1998a, ***Final Site-Specific Field Sampling Plan Attachment for Range 16 AST, Parcel 177(7)***, ***Fort McClellan, Calhoun County, Alabama***, December.

IT Corporation (IT), 1998b, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, October.

Moser, P. H., and DeJarnette, S. S., 1992, ***Ground-water availability in Calhoun County, Alabama,*** Geological Survey of Alabama Special Map 228.

Osborne, W. E., 1999, Personal communication with John Hofer, IT Corporation.

Osborne, W. E., and Szabo, M. W., 1984, ***Stratigraphy and Structure of the Jacksonville Fault, Calhoun County, Alabama,*** Alabama Geological Survey Circular 117.

Osborne, W. E., Irving, G. D., and Ward, W. E., 1997, ***Geologic Map of the Anniston 7.5' Quadrangle, Calhoun County, Alabama,*** Alabama Geologic Survey Preliminary Map, 1 sheet.

Osborne, W. E., Szabo, M. W., Copeland, C. W. Jr., and Neathery, T. L., 1989, ***Geologic Map of Alabama,*** Alabama Geologic Survey Special Map 221, scale 1:500,000, 1 sheet.

Szabo, M. W., Osborne, W. E., Copeland, C. W., Jr., and Neathery, T. L., compilers, 1988,

Geologic Map of Alabama: Alabama Geological Survey Special Map 220, scale 1:250,000, 5 sheets.

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plans***, Engineer Manual EM 200-1-3, September 1.

Warman, J. C, and Causey, L. V., 1962, ***Geology and ground-water resources of Calhoun County, Alabama:*** Alabama Geological Survey County Report 7, 77 p.

APPENDIX A

SAMPLE COLLECTION LOGS

APPENDIX B

BORING LOG

APPENDIX C

SURVEY DATA

APPENDIX D

SUMMARY OF VALIDATED ANALYTICAL DATA

APPENDIX E

DATA VALIDATION SUMMARY REPORT

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	Amber
ANAD	Anniston Army Depot
APT	armor piercing tracer
ASP	Ammunition Supply Point
ASR	Archives Search Report, July 1999
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BFB	bromofluorobenzene
bgs	below ground surface
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
BZ	breathing zone
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CFC	chlorofluorocarbon
CG	cyanogen chloride
ch	inorganic clays of high plasticity
CK	carbonyl chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
COC	chain of custody
COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare materials, clear wide mouth
CX	dichloroformoxime
D	duplicate
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DDT	dichlorodiphenyltrichloroethane
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300 Site
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	fire training area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow stem auger
HTRW	hazardous, toxic, and radioactive waste
I	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion

List of Abbreviations and Acronyms (Continued)

Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
IT	IT Corporation
ITEMS	IT Environmental Management System ™
J	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimer
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	milliSiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchlorethene
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
R	rejected
RCRA	Resource Conservation and Recovery Act
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone
SEMS	Southern Environmental Management & Specialties
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
sm	silty sands; sand-silt mixtures
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list

TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validated qualifier
VX	nerve agent (O-ethyl-S- [diisoproplaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards